

COMPARATIVE FEATURES

REVISED
8/97



Features		32-Bit Microprocessors				32-Bit Microcontrollers			
		Am386SX	Am386DX	Am486DX		ElanSC300	ElanSC310	ElanSC400	ElanSC410
Core CPU		Am386SX	Am386DX	Am486DX		Am386SXLV	Am386SXLV	Am486SLE	Am486SLE
Bus Speed	Frequency @ 3.3 V	25	25	33		25, 33	25, 33	33, 66, 100	33, 66, 100
	Frequency @ 5.0 V	25, 33, 40	25, 33, 40	—		—	—	—	—
Temperature	Commercial or Industrial	C, I (25)	C, I (33)	C, I (66, 100)		C, I	C, I	C	C
Packaging		PQFP 100	PQFP 132	SQFP 208		PQFP 208	PQFP 208	BGA 292	BGA 292
		—	PGA 132	PGA 168		TQFP 208	TQFP 208	—	—
Clocking Scheme*		—	—	2x: 66 (DX2) 3x: 100 (DX4) 4x: 133 (DX5)		**32 kHz osc	**32 kHz osc	**32 kHz osc	**32 kHz osc
Address Space		16 Mbyte	4 Gbyte	4 Gbyte		16 Mbyte	16 Mbyte	64 Mbyte	64 Mbyte
Demux'ed Bus		Yes	Yes	Yes		Yes	Yes	Yes	Yes
Internal Bus Width		32	32	32		32	32	32	32
External Bus Width		16	32	8, 16, 32		8, 16	8, 16	8, 16, 32	8, 16, 32
Cache Size		—	—	16 Kbyte WB, WT		—	—	8 Kbyte WB, WT	8 Kbyte WB, WT
Floating Point		No	No	Yes		No	No	No	No
Page Mode (MMU)		Yes	Yes	Yes		Yes	Yes	Yes	Yes
Icc (mA/MHz)	3.3 V	4.6	4.6	7.0		5.5 mA/MHz	5.5 mA/MHz	6.2 mA/MHz	6.2 mA/MHz
	5.0 V	7.4	7.4	—		—	—	—	—
JTAG Port		No	No	Yes		Yes	Yes	Yes	Yes
Vcc	3.0—5.0 V	3.0—5.0 V	3.0—5.0 V	3.0—3.6 V, 3.3—3.6 V (133)		3.3 and 5.0 V	3.3 and 5.0 V	2.7, 3.3 V, and 3.45 V	2.7, 3.3 V, and 3.45 V
I/O Tolerance	Vcc	Vcc	Vcc	5V		5V	5V	5V	5V
ISA Interface	—	—	—	—		8-, 16-bit	8-, 16-bit	8-, 16-bit	8-, 16-bit
VESA Local Bus	—	—	—	—		16-bit	16-bit	32-bit	32-bit
Power Management	—	—	—	—		Yes	Yes	Yes	Yes
On-chip Rom Controller	—	—	—	—		Yes	Yes	Yes	Yes
On-chip Memory Controller	—	—	—	—		Yes	Yes	Yes	Yes
Integrated PC/AT-Compatible Peripherals	—	—	—	—		Yes	Yes	Yes	Yes
Dual DMA Controllers	Width	—	—	—		8, 16	8, 16	8, 16	8, 16
	Total Number of Channels	—	—	—		7	7	7	7
	External Channels	—	—	—		7	7	2	2
Dual Interrupt Controllers (8259)	—	—	—	—		Yes	Yes	Yes	Yes
Bi-directional Parallel Port with EPP Mode	—	—	—	—		Yes	Yes	Yes	Yes
Serial Port (UART)	—	—	—	—		16450-compatible	16450-compatible	16550-compatible	16550-compatible
Keyboard Interface	—	—	—	—		XT	XT	XT, Matrix	XT, Matrix
General Purpose Input/Output Pins	—	—	—	—		9	9	32	32
Infrared (IrDA Port)	—	—	—	—		No	No	Yes	Yes
PC Card Controller	—	—	—	—		PCMCIA 2.0	No	PCMCIA 2.1	No
	Slots	—	—	—		2	—	2	—
LCD Graphics Controller	—	—	—	—		Yes	No	Yes	No

*Clock multiple refers to ratio of processor operating frequency to bus frequency. **Indicates external clock requirements.

Features

16-Bit Microcontrollers

	80C188 80L188	80C186 80L186	Am188*EM Am188ESLV	Am188ES Am188ESLV	Am188ER* Am188ESLV	Am186*EM Am186ESLV	Am186ES Am186ESLV	Am186ED* Am186EDLV	Am186ER* Am186ER
Speed	Frequency @ 5.0 V	10-25	10-25	20-40	20-40	20-40	20-40	20-40	—
Options	Frequency @ 3.3 V	10-16	10-16	20-25	20-25	20-25	20-25	20-25	20-40
Temperature	Commercial (or Industrial 5.0 V only)	C, I	C, I	C, I	C, I	C, I	C, I	C, I	C, I
Packaging	PLCC	68	68	—	—	—	—	—	—
	PQFP	80	80	100	100	100	100	100	100
	TQFP	80	80	100	100	100	100	100	100
Clocking Scheme*		/2	/2	/2, 1x	/2, 1x	/2, 1x	/2, 1x	/2, 1x	/2, 1x, 4x
CPU	Internal Bus Width	16	16	16	16	16	16	16	16
	External Bus Width	8	16	8	8	8	8/16	8/16	16
	Demux'ed Bus	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	Mux'ed Bus	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Address Space	1 Mbyte	1 Mbyte	1 Mbyte	1 Mbyte	1 Mbyte	1 Mbyte	1 Mbyte	1 Mbyte
	Integrated Memory RAM	0	0	0	0	32 K x 8	0	0	16 K x 16
Peripherals	Timers (with PWM)	3	3	3	3	3	3	3	3
	Watch Dog Timer	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	DMA Channels	2	2	2	2	2	2	2	2
	Ext. Interrupts	5	5	6	8	6	8	8	6
	Int. Interrupts	5	5	7	8	7	8	8	7
	Async Ports	0	0	1	2	1	2	2	1
	Sync Ports	0	0	1	0	1	0	0	1
	Reset Config. Reg.	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	PIO Pins	0	0	32	32	32	32	32	32
	Periph. Chip Selects	7	7	6	6	6	6	6	6
	Memory Chip Selects	6	6	6	6	7	6	6	7
	Pulse Width Demodulation	No	No	No	Yes	No	Yes	Yes	No
	DMA to/from Async Ports	No	No	No	Yes	No	Yes	Yes	No
Glueless RAM Interface		No	No	SRAM	SRAM	SRAM, PSRAM	SRAM	DRAM, SRAM	SRAM, PSRAM
Glueless ROM Interface		No	No	FLASH, EPROM	FLASH, EPROM	FLASH, EPROM	FLASH, EPROM	FLASH, EPROM	FLASH, EPROM
Performance**		2.10***	3.34***	3.37 [†]	3.37 [†]	3.37 [†]	5.35 [†]	5.3 [†]	5.35 [†]
Power Save	Power Save Factor	1-256	1-256	1-128	1-128	1-128	1-128	1-128	1-128
	Icc Max @ 5.0 V	5.0 mA/MHz	5.0 mA/MHz	5.9 mA/MHz ^{***}	5.9 mA/MHz ^{***}	N/A	5.9 mA/MHz ^{***}	5.9 mA/MHz ^{***}	N/A
	Icc Max @ 3.3 V	2.5 mA/MHz	2.5 mA/MHz	4.0 mA/MHz ^{***}	4.0 mA/MHz ^{***}	3.9 mA/MHz	4.0 mA/MHz ^{***}	4.0 mA/MHz	3.9 mA/MHz

* /2: Freq = Osc clock ÷ 2, 1x: Freq = Osc clock x 1, 4x: Freq = Osc clock x 4

** Dhrystone 2.1 VAX MIPS

*** @ 25 MHz w/ 80 ns memory

† @ 40 MHz w/ 70 ns memory

†† @ 40MHz w/ 50 ns memory

††† Preliminary

+ The Am188ER and Am186ER microcontrollers have 5.0 V-tolerant I/Os.

The Industrial version is 3.3 V.

• The Am186ED microcontroller has 8-bit boot and programmable bus sizing options to perform like an Am188. No Am188ED controller is available.

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LIT-15M-8/97-0

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